

Instructor: Nicholas Salcedo (nicholas.salcedo@marin.edu), Room SC165

Course objective: To learn about the fundamentals of Geographic Information Systems (GIS) and how to use Environmental Systems Research Institute's (ESRI) ArcGIS and Google's Google Earth and Google Maps software programs.

Prerequisites: There are no prerequisites but a background in geography or computers, specifically electronic data storage and transfer methods using Windows Explorer, is helpful.

Course format: Class time is broken into three parts: (1) lecture on the evening's topic, (2) computer time for ArcGIS exercises and Google Earth/Map and (3) a review/demonstration of that evening's topic. Two breaks are included in each class and additional short breaks to stretch and rest the eyes are strongly encouraged.

Required materials: (1) [*Getting to Know ArcGIS Desktop*](#) (2nd Ed.), Updated for ArcGIS 10 ESRI Press, 2010. Includes ArcGIS 10 trial software, data and exercises on a DVD, and (2) a USB external storage drive (1GB min. recommended, more memory is good, proper file management is better).

Class schedule:

Week 1 - Introduction to Geographic Information Systems

What is a GIS? Introduction to desktop GIS. Exploring ESRI's "ArcMap," "ArcCatalog" and Google Earth and Maps (NOTE: week one also includes introduction to fellow students, the classroom, computers and logistics of the class).

Reading: Chapters 1 thru 4 of *Getting to Know ArcGIS* (GTKArcGIS).

Week 2 – “Got Spatial Data?” and Displaying GIS Data

The importance of GIS data: “what is GIS data?” and “where do you get GIS data?” Symbolizing vector features and raster datasets, classifying data and labeling features. Plus, the history of GIS and the creation of a simple map – time permitting.

Reading: Chapters 5 thru 7 of *Getting to Know ArcGIS*.

Exercises: Exercises 3a – 3c and 4a – 4c. **What to Turn In: GTKArcGIS 4c**

Week 3 – “Know Spatial Data!” or Tables (Spreadsheets) and Query of GIS information

Background and introduction to tables and spreadsheets. Querying attribute data and joining and relating tables. Also, an introduction to ESRI and GIS terminology and jargon.

Reading: Chapters 8 thru 9 of *Getting to Know ArcGIS*.

Exercises: Exercises 5a – d, 6a – d and 7a – c. **What to Turn In: GTKArcGIS 6d**

Week 4 – “Analyzing Spatial Data”

Selecting features, preparing data for analysis, analyzing spatial data and geoprocessing. Plus an introduction to designing and creating GIS data, which will be covered more in Week 5.

Reading: Chapters 10 thru 12 of *Getting to Know ArcGIS*.

Exercises: Exercises 8a – c, and 9a – b. **What to Turn In: GTKArcGIS 8c**

Week 5 – “Making Spatial Data.” Introduction to GPS and Projections

Introduction to Global Positioning Systems (GPS): how it works, different receivers and collecting GPS data. More on designing and creating GIS data: geodatabases, types of features, scales and schemas (attribute fields and defining domains). This week may also introduce “datums” and “projections” which will be covered more completely in Week 6.

Reading: Chapters 13 thru 14 of *Getting to Know ArcGIS*.

Exercises: Exercises 10a – b, 11a – d, 12a – c and 13a – b. **What to Turn In: GTKArcGIS 12c**

Week 6 – Displaying and Analyzing Spatial Data We Made ... then Fixing It

Coordinate systems (datums and map projections) are covered in more detail. This includes projecting data “on the fly” and defining projections for existing spatial data. Introduction to editing existing GIS data (or creating new data) by using editing and drawing tools, including deleting, modifying, splitting and merging features and their attributes.

Reading: Chapters 15 thru 17 of *Getting to Know ArcGIS*.

Exercises: Exercises 14a – c, 15a – b, 16a – c and 17a – c. **What to Turn In: GTKArcGIS 16c**

Week 7 – Cartography: The Art and Science of Making a Map

Introduction to cartography, making maps from templates and spatial data presentation. Also, an overview of base maps, satellite and aerial imagery (orthophotos) and internet map services.

Reading: Chapters 18 thru 20 of *Getting to Know ArcGIS*.

Exercises: Exercises 18a – c, 19a – d and 20a – c. **What to Turn In: GTKArcGIS 19d**

Week 8 – Advanced GIS Analysis, GIS Issues and the Future of GIS – Test Review

Advanced applications of GIS (spatial analysis, modeling), GIS issues (data ownership, privacy, education, accuracy) and the future of GIS (data; hardware; software, internet). Introduce the **Term Project** (see Week 10). Open time to discuss other GIS/GPS topics of students’ choice.

****TEST REVIEW****

Reading: none assigned – use time for make-up or project research

Exercises: none assigned – use time for make-up or project research

Week 9 – TEST (includes making an 8.5” x 11” black and white paper map)

Reading: none

Exercises: none

Weeks 10 and 15 – The Term Project

Introduction of the **Term Project**: ground rules and milestones, such as project formulation, research, GIS data gathering or creation, analysis, cartography and presentation. Organize into **Term Project Teams**. (NOTE: Topics for each Team's **Term Project** are to be finalized by **Week 12**. All deliverables or products are due on **Week 16**).

Week 16 – Presentations of Term Projects

Presentation of final poster, discussion of steps taken to create the project, highlighting successful (and not so successful) steps, and additional research or work that could be pursued.

Grading:

Test and Map 35%

Term Project 40%

Weekly [Getting to Know ArcGIS Desktop](#) exercises 15%

Class Participation 10%

[Getting to Know ArcGIS Desktop](#) exercises are to be submitted in electronic format (*.pdf). Final due date for all exercises is Week 16; however, it is recommended that the exercises are completed as close as possible to the schedule above to save time for the **Term Project**.

Term Project deliverables include a GIS feature class developed by the team (complete with metadata), a final ArcMap (*.mxd) project, a poster (approx. 24"x36") whose main element is a map, and a presentation and summary of the steps accomplished over the course of the project.

Students can elect to receive a letter grade or pass/no pass (selecting the pass/no pass option is the sole responsibility of the student per the deadlines in the Academic Calendar).

Students must inform instructor of any absences as soon as possible (preferably before class) so arrangements can be made for the student to make up any work or get information on a lecture topic in a timely manner.

Office hours: Before class in room SC144 or room SC165.